

18. Design a conceptual outline of a bioreactor suitable for plant cell culture, highlighting critical engineering parameters.
19. Analyze the advantages and disadvantages of enzyme immobilization methods with industrial examples.
20. Discuss in detail about microbial production of Vitamin B12 and Folic acid.



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**23UBT53 — ENVIRONMENTAL AND
INDUSTRIAL BIOTECHNOLOGY
(Core Course XI)**

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define acid rain and mention one harmful effect.
2. What is photochemical smog?
3. Differentiate between primary and secondary wastewater treatment.
4. What is Single Cell Protein (SCP)?.
5. Mention any two differences between batch culture and continuous culture.
6. What is the function of a sparger in a bioreactor?
7. What is enzyme immobilization?.
8. Mention one fermented product made from dairy.

9. Name any two microbial sources used as biopesticides.

10. What is ore leaching?

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions.

11. (a) Explain the greenhouse effect with a neat diagram.

Or

(b) Describe biotechnological strategies for environmental management.

12. (a) Explain the role of aquatic plants in wastewater treatment.

Or

(b) Describe biotechnological methods for tannery effluent treatment.

13. (a) Write short notes on bubble column and airlift reactor.

Or

(b) Explain the role of agitators and baffles in mixing.

14. (a) Explain membrane processes in downstream processing.

Or

(b) Write short notes on biosensors and their applications.

(a) Describe the production process of penicillin.

Or

(b) Write short notes on biosurfactants and their applications.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Critically analyze the impact of global warming on biodiversity and propose sustainable management solutions.

17. Evaluate the advantages and limitations of aerobic and anaerobic methods of wastewater treatment with suitable examples.

